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(54) **METHOD FOR MAKING SURFACTANT-TEMPLATED THIN FILMS**

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(58) **Field of Search** 427/245, 240, 427/346, 377, 376.2, 397.7, 387, 421, 430.1

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(57) **ABSTRACT**

An evaporation-induced self-assembly method to prepare a porous, surfactant-templated, thin film by mixing a silica sol, a solvent, a surfactant, and an interstitial compound, evaporating a portion of the solvent to form a liquid, crystalline thin film mesophase material, and then removal of the surfactant template. Coating onto a substrate produces a thin film with the interstitial compound either covalently bonded to the internal surfaces of the ordered or disordered mesostructure framework or physically entrapped within the ordered or disordered mesostructured framework. Particles can be formed by aerosol processing or spray drying rather than coating onto a substrate. The selection of the interstitial compound provides a means for developing thin films for applications including membranes, sensors, low dielectric constant films, photonic materials and optical hosts.

21 Claims, 7 Drawing Sheets